

## **AUDUBON CANYON RANCH**

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25 September 1997

Ed Ueber, Sanctuary Manger  
Gulf of the Farallones National Marine Sanctuary  
Fort Mason, Building 201  
San Francisco, CA 94123

RE: Motorized personal watercraft on Tomales Bay

Dear Mr. Ueber:

Audubon Canyon Ranch (ACR) manages a system of wildlife sanctuaries in Marin and Sonoma Counties, including approximately 450 acres of shoreline properties on Tomales Bay. ACR urges the National Marine Sanctuary to prohibit the use of motorized personal watercraft (PWCs) in the National Marine Sanctuary, and especially in Tomales Bay. The following information demonstrates clearly that PWCs have major negative impacts on birds and other wildlife, and should therefore be prohibited within the National Marine Sanctuary.

Although the effects of PWCs on wildlife are not yet quantified in the primary (refereed) scientific literature, Joanna Burger, of Rutgers University and author of several papers on human disturbances to wildlife, completed a study of PWCs this past summer and has a manuscript ready for submission to a major journal (personal communication and unpublished ms). She measured the number of disturbance flights of Common Terns in New Jersey and found that even at slower speeds, PWCs were a significantly stronger source of disturbance to birds than were motor boats. Levels of disturbance were further increased when PWCs were used at high speeds or outside of established boating channels. She did not measure noise effects, but recognized noise as a confounding disturbance factor, related to speed, in any kind of boat; however, when compared in any speed category, PWCs made more noise than motor boats. Burger's work clearly demonstrates in quantitative terms what most observers have long known: that PWCs are not just another kind of boat, but cause dramatically greater negative impacts to wildlife than do other motorized boats.

I also have other soon-to-be published data that destroy the myth that the impacts of PWCs are no worse than those of motor boats. These data are from Jim Rogers of the Wildlife Research Laboratory of the Florida Game and Freshwater Fish Commission (personal communication; table of preliminary results attached). Dr. Rogers has published several papers on wildlife responses to human disturbance (Rogers and Smith 1995, 1997), and has recently compiled results of field tests using PWCs. Interestingly, he has encountered a "statistical nightmare" unique to PWC impacts, that requires up to 7 times more data to delineate disturbance responses of shorebirds, wading birds, and other waterbirds. This is because the responses of species and individuals to PWCs fail to follow any clear pattern, while data from all other types of human disturbance can be handled using a standard statistical procedure. Rogers' quantitative results show clearly that PWCs cause wildlife to flush at greater distances, with more complex behavioral responses than observed in disturbances caused by automobiles, all-terrain vehicles, foot approach, or motorboats. Rogers

noted that Brown Pelicans, which often approach other vessels quite closely, maintain a large distance from PWCs (personal communication). It is worth noting also that when not disturbed, Brown Pelicans use the Sand Point spit and nearby emergent sand bars for roosting, and areas near surf zones and the mouth of Tomales Bay; these areas also preferred by personal watercraft operators.

In 1992-93, PWCs were banned from the waters surrounding the Key Deer National Wildlife Refuge in Florida, because of associated disturbances to wildlife. This decision was made from a pro-active position, at a time when relatively few PWCs used the area, but subsequently there has been an explosion of use in the surrounding region, with local commercial dealerships of PWCs increasing from 0 to 5. Tom Wilmers, US Fish and Wildlife Biologist at Key Deer National Wildlife Refuge, enthusiastically offered to "go on record" here with several of his relevant observations (personal communication). He has seen as many as 17 PWCs simultaneously dominate sensitive mangrove areas, prohibiting use by birds and other wildlife. I would like to add that overhanging willows in many salt marsh coves and creek mouths in Tomales Bay create isolated habitats that could be easily dominated by personal watercraft use, and which provide important habitat for Common Goldeneyes, mergansers, kingfishers and other waterbirds (Kelly and Tappen 1997). Wilmers has also seen a PWC repeatedly flush an Osprey from its nest site 11 times in less than an hour. Ospreys nest in Tomales Bay and in adjacent habitat in considerable numbers (Evens 1993). Wilmers further noted that PWCs typically perform in a selected cove, point area, or channel for extended periods of time before moving to other areas, thus increasing disturbance by reducing opportunities for displaced birds to return to feeding or nesting areas. He has seen PWCs land at a clearly posted Western Hemisphere Shorebird Reserve Piping Plover Registry site, flushing all plovers from the area. According to Wilmers, PWCs literally "blow" shorebirds off of roosting sites by driving at high speeds along the shore. This is not hard to imagine, because roosting shorebirds are very sensitive to disturbance. Two of the largest high-tide shorebird roosts in Tomales Bay are at the north end of the Bay, where PWC activity is currently most prevalent; these sites are at Brazil Beach and on Tomales Point just outside the mouth (Kelly 1990). Most of the shorebirds that forage from Walker Creek northward in Tomales Bay use these roost sites (Kelly 1990).

Unlike other motorized watercraft, PWCs often operate in shallow water adjacent to creek deltas, salt marshes, and sand spits, where shorebirds roost during high tide periods. Shorebirds are particularly vulnerable to disturbance at such sites (Burger and Gochfield 1991, Davidson 1993). Other species such as cormorants, American White and Brown Pelicans, Black Brant, and harbor seals also use these habitats. Kirby et. al (1993) have shown that human disturbance at roost sites can force shorebirds to completely abandon an estuary. With a dwindling availability of undisturbed beaches in our area, the protection of the existing high-tide roosts from additional human disturbance could be crucial to maintaining shorebird populations in the Marine Sanctuary.

The Gulf of the Farallones National Marine Sanctuary supports a large proportion of the Great Blue Herons and Great Egret populations in the San Francisco Bay region of California (approximately 21% and 23 % respectively, Kelly et al. 1993). A large nesting colony of approximately 20 pairs of Great Blue Herons and 55 pairs of Great Egrets occurs at the north end of Tomales Bay, near Sand Point, where numerous adult and juvenile birds depend on undisturbed shallow feeding areas from Walker Creek northward (Kelly 1995). Data from Rogers (attached) show that Great Egrets are more strongly disturbed by PWCs than by motor boats, showing a minimum flushing tolerance of 125 meters in response to PWCs compared to 107 meters for motor boats. Tom Wilmers further noted that PWCs commonly flush foraging herons and egrets at low tide in areas generally too shallow for other boats.

An important question is whether birds displaced from shallow feeding areas by PWCs suffer significant biological effects. Published evidence strongly suggests that estuarine birds may be seriously affected by even occasional disturbance during key parts of the feeding cycle. Fox et al. (1993) showed that American Wigeon flushed from eelgrass feeding areas will abandon the area until the next tidal cycle unless the disturbance occurs early in the feeding cycle. Brant, which also feed tidally in eelgrass in Tomales Bay, display similar distributional responses (Stock 1993). Like motor boat operators, PWCs claim to avoid eel grass, but eelgrass beds in Tomales Bay are often not visible, and many boats are commonly seen traveling over eelgrass. Officials at Pacific Rim National Park in Canada have seen eelgrass damaged and killed by PWCs.

Increased levels of disturbance in other types of shallow-water habitats might elicit similar responses in foraging waterbirds. For example, large changes in bird abundances should be expected if PWCs use the easily accessible areas of Tomales Bay south of Millerton Point where nearly all boat traffic is currently excluded because the water is too shallow. Although eelgrass is absent, large concentrations of waterbirds throughout this area indicate preferred habitats for Western and Clark's grebes, Greater Scaup, American Wigeon, Ruddy Ducks, and shorebirds (Kelly and Tappen 1997).

Waterbirds almost invariably rely on energetically expensive flight as a response to disturbance. To compensate for increased levels of disturbance, they must either increase their food intake to balance additional flight costs, or fly to other less profitable but less disturbed areas to feed. Waterbirds must also accumulate fat and protein reserves to override winter periods of low food availability, prepare for migration, and to store energy for breeding. If feeding opportunities are already restricted, or birds cannot balance their energy needs, increased disturbance could lead to abandonment of the area, reduced reproduction, or starvation (Davidson and Rothwell 1993, Baldassarre and Bolen 1994).

Tomales Bay is a haven for waterbirds, supporting 22,000-25,000 loons, grebes, cormorants and other groups, in addition to as many as 20,000 wintering shorebirds, and is apparently the most productive winter habitat for Bufflehead on the Pacific Coast south of the Columbia River (Kelly 1992, Kelly and Tappen 1997). An extensive scientific literature demonstrates that populations of waterbirds and shorebirds are extremely sensitive to disturbance from human activities (Dahlgren and Korshgen 1992, Davidson and Rothwell 1993, York 1994). Therefore, it is crucial, given that protection of the marine environment and resources is the top management priority in the National Marine Sanctuary, that these populations are protected from increased human disturbance.

PWCs are particularly disturbing to wildlife because of their high speeds, unpredictable movements and excessive noise. I have personally seen that shorebirds and waterbirds on Tomales Bay are more easily disturbed by *changes* in speed or direction than by movement at a steady moderate speed in a constant direction. An immediate *reduction* of speed can flush a flock from a roost area as easily as quick acceleration. Typically, jet skis do both during normal use. In discussing his research on wildlife disturbance, Rogers (see above) explained that much of the increased disturbance caused by PWCs is because only PWCs accelerate or travel at extreme speeds directly toward the shore, while motor boats generally slow down as they approach the shore.

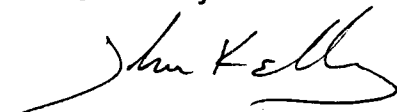
Judy McIntyre, researcher and director of the North American Loon Fund told me that she personally feels PWCs are the greatest current threat to breeding loon populations. Two of three loon species in the Sanctuary become flightless for several weeks in fall and winter during a simultaneous wing molt. Consequently, foraging loons are often unable to fly away

from disturbances. I have also seen during waterbird surveys on Tomales Bay, that large grebes invariably escape by diving (Kelly and Tappen 1997). Forced to dive, loons and grebes are more likely than other species to be surprised or hit when resurfacing near fast unpredictable personal watercraft. This point is made clear by Evans et al. (1992) who found that PWCs produce less low-frequency underwater noise than motor boats, but very loud high frequency noise at very close distances. Thus a PWC provides less subsurface auditory warning until right on top of an animal, at which point the noise becomes instantly very loud.

Most waterbirds as well as many fishes and crabs in Tomales Bay heavily exploit seasonally abundant pacific herring and herring roe for food (Hardwick 1973, Bayer 1980, Haegele 1993, Kelly and Tappen 1997). It is reasonable that adverse impacts on herring populations might reduce the number of waterbirds in the Bay. At any time prior to spawning, herring exhibit well-documented avoidance responses to noise (Moore and Wyatt 1990). Given the narrow shape of Tomales Bay, especially near the mouth where PWCs are most common, additional excessive noise might cause schools of herring to leave or fail to enter the Bay. As an example, using side-scan sonar, one school of herring was observed moving out of the Bay when confronted by noisy fishing boats near Hog Island (Moore and Wyatt 1990).

In order to protect wildlife from an obvious menace, PWCs have been successfully banned from numerous state, national and international parks and refuges, with rulings based not on formally controlled ecological studies but on simple and reasonable assessments of the obvious: PWCs pose a major threat to wildlife. In order to protect existing populations of birds and other wildlife, we are hopeful that motorized personal watercraft will be banned from the Gulf of the Farallones National Marine Sanctuary. Thank you.

John Kelly



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